

Brucellosis: a devastating disease

for Indian farmers

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Brucellosis is a bacterial zoonotic disease caused by the genus Brucella. The pathogen reduces the productivity of animal due to abortion during the late trimester of pregnancy besides imparting burden on animal health that may lead to huge economic loss. Proper awareness among livestock owners and consumers can prevent such infections. Vaccination of susceptible animals in early age can help reduce the incidence of this disease in animals.

Keywords: Bacterial disease, Brucellosis, Livestock, Zoonosis

BRUCELLOSIS is a bacterial disease often associated with abortion storm in farms that leads to heavy economical losses for Indian farmers. The money spent on feeding and management of animals goes in vain due to abortion at the last trimester due to the infection. This leads to loss of lactation yield up to 25%, and increases the chances of acquiring reproductive disorders such as repeat breeding and reduced fertility in animals. It is also an important public health concern for people associated with the livestock industry as the infection can be transmitted from animals to humans (zoonosis). The classical species of *Brucella* responsible for causing disease in animals are *Brucella abortus* (cattle), *B. melitensis* (goat), *B. suis* (pigs), *B. ovis* (sheep), *B. canis* (dogs), *B. neotomae* (wood rat). Out of the six classical species, *B. melitensis* is known to be the most pathogenic for human health and it can be weaponized for biological warfare.

Modes of transmission

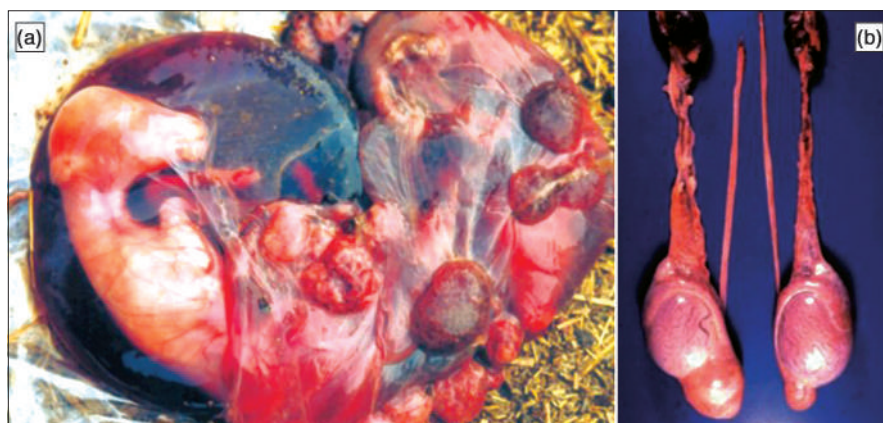
It can infect both humans as well as animals simply through contact of abraded skin or mucous membrane with infected materials such as vaginal discharge and aborted fetus. The aerosols generated on handling

of contaminated material may also lead to the spread of infection via respiratory route or through conjunctiva. Humans mainly get the infection through consumption of unpasteurized milk and milk products obtained from infected animals, particularly from goats. Live attenuated vaccines used for vaccination of animals against the disease may also act as a potential source of infection, if injected accidentally in humans. The male animals, once infected, will remain carriers throughout their life and the semen of infected bulls may spread the infection to the herd through artificial insemination.

Symptoms

Abortion or premature birth of calves spreading like a storm in the herd signals brucellosis outbreak in farm. Animals may also show related problems like retained placenta and inflamed uterus. In male animals, the testis becomes enlarged, and sometimes atrophied due to fibrosis that may result in decreased libido and infertility.

In humans, profuse sweating with a peculiar odour at night is a characteristic symptom along with fever and chills. Body temperature may fluctuate from normal in the morning to 40°C (104°F) in the afternoon with other symptoms like



(a) Aborted fetus (4 months old) of goat, (b) Epididymitis in a bull
(Source: WHO/CDS/EPR/2006.7)

general weakness, pronounced fatigue on exercise, insomnia, sexual impotence and anorexia. In pregnant women, it may cause abortion in the last trimester due to its special affinity for erythritol sugar which is abundantly produced in placenta.

Common diagnostic tests of Brucellosis in animal and humans

The Rose Bengal Plate Test (RBPT), serum agglutination tests and ELISA are some of the common serological tests for diagnosing brucellosis in both animals and humans.

Milk ring test is used as a herd screening test for brucellosis in animals. Complement fixation test (CFT) is recommended as the confirmatory test for diagnosis of brucellosis, moreover this cannot be used in regular diagnosis of brucellosis as this is labor intensive and requires skilled human resources to perform the test.

Prevention and control of Brucellosis

Prevention is better than cure. Vaccination works like a panacea in preventing brucellosis outbreak on farm. Different types of vaccines are available for prevention of brucellosis in animals such as *Brucella abortus* strain 19 (S19 most commonly used vaccine), *Brucella melitensis* Rev 1, RB51. These are live attenuated vaccines available for animals, however, we don't have any vaccines available for human use. Brucellosis in human can be controlled by control of the disease in animals. Female calves aged between 4–8 months are recommended for vaccination by S19 vaccine. For better control of the disease in a herd, infected animals should be segregated from the rest of the herd. For prevention of brucellosis in humans, direct contact of infected or suspected animals should be avoided, consumption of unpasteurized milk or milk products is not recommended as the organism keeps on shedding

the bacteria in milk. The pregnant lady should take special care as the infection may also cause abortion in humans. As the S19 vaccine used for vaccination in animals are live vaccines, may pose risk to the vaccinator of acquiring infection by an accidental prick on their hand while vaccinating animals, hence proper biosafety measure and care must be taken while vaccinating animals under field conditions with live attenuated vaccines.

SUMMARY

Brucellosis is a devastating disease caused by *Brucella*. It is capable of infecting both animals and humans. Infection in dairy animals, viz. cattle, goat, sheep leads to huge losses. The disease can be prevented by timely vaccination and preventing direct contact with infected animals.

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Treatment of mastitis and metritis using mesenchymal stem cells (MSCs) in cattle

Mastitis and metritis in dairy cattle and buffaloes reduce milk yield and fertility leading to immense economic losses. This study aimed at treating these diseases in cattle by treatment with MSCs. MSCs isolated from the adipose tissue of a cow were characterized by confirming the expression of specific markers, viz. alkaline phosphatase, CD73, CD90 and CD105 and absence of CD34, CD45 and CD79a. MSCs were injected through local and intravenous routes. All the animals were cured completely demonstrating the potential of MSCs for treatment of mastitis and metritis in cattle.

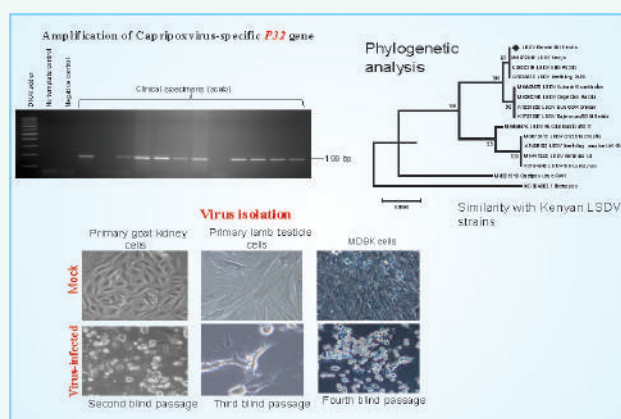


(a) Before treatment of mastitis with MSCs; (b) 60 days after treatment with MSCs

Source: ICAR Annual Report (2020)

Isolation and characterization of Lumpy skin disease virus (LSDV) from cattle in India

An outbreak was investigated in infected cattle of Ranchi. The most prominent clinical finding was skin nodules all over the body surface and could be seen immediately after febrile stage. The lesions were particularly extensive in the fetlock region, extending up to the underlying subcutis and muscle. Few pregnant animals aborted. Morbidity was ~8% in the organized dairy farm and up to ~50% in small dairy units in the villages. The etiological agent was identified by the NCVTC as Lumpy skin disease virus. The virus could be isolated in primary goat testicle cells and confirmed by the amplification of three LSDV specific fragments. Phylogenetic analysis suggested that the isolated virus is closely related with Kenyan LSDV strains.



Source: ICAR Annual Report (2020)